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**FLEXIBLE GAP COVERING BETWEEN AN ADJUSTABLE STEERING  
COLUMN OF A MOTOR VEHICLE AND AN INSTRUMENT PANEL AND  
METHOD OF MAKING SAME**

**BACKGROUND AND SUMMARY OF THE INVENTION**

**[0001]** This application claims the priority of German Application No. 102 42 966.9 filed September 17, 2002, the disclosure of which is expressly incorporated by reference herein.

**[0002]** The invention relates to a flexible gap covering between an adjustable steering column of a motor vehicle and an instrument panel, the gap covering on one side, being fastened to a steering column covering and, on the other side, being fastened to the instrument panel.

**[0003]** From German Patent Document DE 195 25 181 A1, a flexible gap covering between a flexible steering column of a motor vehicle and an instrument panel is known, where the frame-type gap covering constructed in one piece, on one side, is fastened to the steering column covering and, on the other side, is fastened to the instrument panel. The mounting of this one-piece gap covering on the steering column covering and on the instrument panel is difficult and time-consuming because of the narrow space conditions in the gap area.

**[0004]** It is an object of the invention to further develop a flexible gap covering between an adjustable steering column of a motor vehicle and an instrument panel such that it permits a large adjusting range of the steering column, is easily mountable and, in addition, has an attractive appearance.

**[0005]** According to the invention, this object is achieved by providing a flexible gap covering assembly between an adjustable steering column of a motor vehicle and an instrument panel, the gap covering assembly, on one side, being fastened to a steering column covering and, on the other side, being fastened to the instrument panel, wherein the flexible gap covering comprises an upper covering

and a lower covering, wherein the upper covering comprises two parts which are arranged above one another and are fixedly connected with one another in a joint overlapping area, and wherein at least one tensioning element is applied to the joint overlapping area on a side facing away from a vehicle occupant compartment when installed in a motor vehicle.

**[0006]** Further advantageous features of preferred embodiments of the invention are described herein and in the claims.

**[0007]** The important advantages achieved by means of preferred embodiments of the invention are that the flexible gap covering formed by an upper covering and a lower covering can be mounted in a rapid and simple fashion. As a result of the two-part construction of the upper covering and the arrangement of at least one tensioning element, the two parts of the upper covering are tensioned in all positions of the steering column, so that the parts take up a visually attractive low-wrinkle tensioned position. Both coverings of the flexible gap covering assembly may be preassembled with one end either on the instrument panel or the steering column covering, whereas the other end can be fastened by way of a releasable fastening according to certain preferred embodiments of the invention. Furthermore, by means of the flexible gap covering assembly, a muffling effect is achieved and no dirt can penetrate through the recess according to certain preferred embodiments of the invention. The flexible gap covering assembly permits large adjusting movements of the steering column and is held in a taut low-wrinkle tensioned position by means of the at least one tensioning element according to certain preferred embodiments of the invention.

**[0008]** Other objects, advantages and novel features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

[0009] Figure 1 is a view diagonally from the front of the instrument panel of a vehicle having a recess for the guiding-through of a steering column as well as a steering column covering, constructed according to a preferred embodiment of the present invention;

[0010] Figure 2 is a partial enlarged view from the front onto the instrument panel, the steering column covering and a flexible gap covering assembly between the steering column covering and the instrument panel to the arrangement of Figure 1;

[0011] Figure 3 is a view laterally from the outside onto the instrument panel, the steering column covering and the gap covering assembly of the arrangement of Figure 1;

[0012] Figure 4 is a sectional view taken along Line III-III of Figure 2;

[0013] Figure 5 is a sectional view similar to Figure 4 showing a second embodiment for fastening the tensioning element;

[0014] Figure 6 is a sectional view taken along Line VI-VI of Figure 2.

## **DETAILED DESCRIPTION OF THE DRAWINGS**

[0015] Figure 1 shows a partial area of an instrument panel 1, in which case a recess 4 is provided in the driver's range below a scoop 3 accommodating instruments 2, through which recess 4 a steering column 5 is guided which, on its upper end, is connected with a steering wheel not shown in detail. The steering column 5 penetrates the recess 4 in the instrument panel 1 and can be adjusted in the axial direction (arrows A) as well as in its height (arrows B) (Figure 4). When the steering column is adjusted in its height, the adjustable

area of the steering column 5 with the steering wheel swivels about an axis of rotation which is not shown and is situated close to the recess 4.

**[0016]** Adjacent to the steering wheel, the steering column 5 is provided with a steering column covering 6 toward the vehicle occupant compartment, which steering column covering 6 is composed of an upper shell 7 and a lower shell 8. The upper shell 7 and the lower shell 8 are adjoined along a steering column center plane Y-Y and are detachably connected with one another as well as with the interior steering column 5. In the front and in the rear, the steering column covering 6 has openings 9, 10 for the passing-through of the steering column 5. Recesses 11, 12 for a turn signal lever or a wiper lever are provided on the lateral surfaces of the steering column covering 6. During an adjusting movement of the steering column 5, the steering column covering 6 moves along with the adjustable steering column 4, and a surrounding gap 13 will change between the steering column covering 6 and the recess 4 of the instrument panel 1.

**[0017]** For covering the changeable gap 13, a flexible gap covering assembly 14 is provided which comprises a bendable foldable material, such as leather, imitation leather, or the like.

**[0018]** The flexible gap covering assembly 14 comprises an upper covering 15 and a lower covering 16, the separation between the two coverings 15, 16 being situated in the area of the steering column center plane Y-Y. The upper covering 15 comprises two parts 17, 18 made of a bendable foldable material, which - viewed in the vertical direction - are arranged above one another, and are sewn together, glued together or otherwise connected with one another in a common overlapping area 19. At its edge 20 situated away from the overlapping area 19, the upper part 17 of the covering 15 is held in position by means of a holding clamp 21 on a bridge 22 of the instrument panel 1. In this case, a bent edge area of the upper part 17 is clamped between the underside of the bridge 22 and the holding clamp 21, the holding clamp 21 being fastenable on the bridge 22 by

means of welding, snapping, or the like. The bridge 22 is detachably connected with the instrument panel 1 situated underneath. At its edge 23 situated away from the overlapping area 19, the lower part 18 of the covering 15 is fastened by means of an approximately U-shaped tensioning frame 24 to the exterior side of the upper shell 7 of the steering column covering 5. Here also, a bent edge area of the lower part 18 is clamped between the exterior side of the upper shell 7 and the tensioning frame 24. The tensioning frame can be fastened to the upper shell 7 by means of snapping, welding or the like.

**[0019]** According to Figure 4, the upper shell 7 has a set-back depression 26 in the fastening area for the upper covering 15. The upper covering 15 is acted upon by at least one tensioning element 27. One end 28 of the tensioning element 27 is connected to the joint overlapping area 19 of both parts 17, 18, whereas the other end 29 of the tensioning element 27 is detachably connected with the free end 31 of a molded-on holding arm 30 of the bridge 22. Preferably, two mutually spaced holding arms 30 are provided on the bridge 22 viewed in the transverse direction, one tensioning element 27 respectively being fastenable to the holding arms 30. A downward-projecting hook 32 of each holding arm 30 is used for fastening the end 29 of the tensioning element 27. The end 29 of the tensioning element 27 has an opening which permits a hooking-in of the tensioning element 27 on the hook 32 of the holding arm 30 (Figure 5). In the embodiment shown, the tensioning element (27) is formed by a flexible rubber band.

**[0020]** When the steering column 5 is swivelled up and has not moved out, the two parts 17, 18 of the upper covering 15 extend in sections directly above one another and are tensioned by the tensioning element 27. When the steering column 5 is moved downward or toward the driver, the two parts 17, 18 of the upper covering 15 extend at an angle  $\alpha$  with respect to one another, in which case both parts 17, 18 of the upper covering 15 are tensioned by the stretched

tensioning element 27 and take up an approximately prolate position (see Figure 4). However, according to Figure 4, the part 17 of the upper covering may also have a slightly curved shaping (shown by a dash-dotted line).

**[0021]** The one-piece lower covering 16 is, on the one side, tensioned by means of at least one inserted tensioning frame 33 against the exterior side of the lower shell 8 of the steering column covering 6 and is fastened to it by means of gluing, snapping, welding or the like. The other edge area of the lower covering 16 is locally held in position in a similar manner on the instrument panel bottom part 34 (see Figure 6).

**[0022]** The foregoing disclosure has been set forth merely to illustrate the invention and is not intended to be limiting. Since modifications of the disclosed embodiments incorporating the spirit and substance of the invention may occur to persons skilled in the art, the invention should be construed to include everything within the scope of the appended claims and equivalents thereof.